REPORT / RECOMMENDATION

To: Edina Transportation Commission

Work Session Item #: VI. A.

From: Mark K. Nolan, AICP, Transportation Planner

Action ☐
Discussion ☒
Information ☐

Date: July 17, 2014

Subject: Living Streets Plan Update

Action Requested:

No action requested.

Information / Background:

Please recall that Council passed the Living Streets Policy in August of last year. Since that time, monthly meetings have been held with the Living Streets Advisory Group (LSAG), made up of members of Edina's boards and commissions, and an internal team comprised of Edina staff members from various departments. Staff is in the process of preparing the draft Living Streets (Implementation) Plan and anticipates the final Living Streets Plan will be presented to Council later this fall.

On July 1, staff and the LSAG attended a City Council work session to solicit input from Council on the Plan; specifically, the Living Streets street types and design guidelines (attached) were discussed, as well as how the Plan will ultimately function. In general, the Council had very positive feedback regarding the draft Plan, and expressed a desire to approve the Sidewalk Facilities Plan (a component of the Living Streets design guidelines) prior to the approval of the entire Plan document. The former is anticipated to be ready for Council approval in September, while the latter is anticipated to be approved by year's end. Additionally, while the Living Streets Plan functions as a set of guidelines, Council and the LSAG generally agreed that the Plan should be referenced by City Code/Ordinance in order to give the Plan more influence.

Attached are two chapters from the draft Living Streets Plan: the "Network of Living Streets" which covers the different types of Living Streets and their location, and the "Design Guidelines," which discusses the different Living Streets elements and how they are applied (including Sidewalk Maps). These chapters are included here because they illustrate the physical manifestation of the Living Streets Policy. Below is an outline of the Plan, the other chapters of which are in various levels of completion.

Draft Living Streets Plan Outline

1. Background
    - 1.1. Introduction
    - 1.2. The Challenge
    - 1.3. Understanding Living Streets

- 1.4. Benefits of Living Streets
- 1.5. Supporting City Plans

2. Vision, Principles and Benchmarks
   - 2.1. Vision
   - 2.2. Principles
   - 2.3. Benchmarks and Performance Measures
3. Network of Living Streets
   - 3.1. Classification and Roles of Streets
   - 3.2. Living Street Types
4. Design Guidelines
   - 4.1. Streets
   - 4.2. Pedestrian Facilities
   - 4.3. Bicycle Facilities
   - 4.4. Traffic Calming
   - 4.5. Streetscape and Stormwater Management (draft outline)
   - 4.6. Lighting and Street Furniture
5. Design Process and Resident Engagement
6. Connectivity Guidelines
   - 6.1. Private Development
   - 6.2. Neighborhood Parks
   - 6.3. Schools

Attachments:

Draft Living Streets Plan Chapter 3: Network of Living Streets
Draft Living Streets Plan Chapter 4: Design Guidelines

3. NETWORK OF LIVING STREETS

INTRODUCTION

Edina Living Streets defines a new set of Street Types that classify the City's streets based not only on their function, but also on the character of the street and adjacent land uses. These Street Types are developed to guide future road design projects and are meant to supplement the traditional functional classification system of streets. The new Street Types support Living Streets principles and designs, and reflect the diverse range of conditions in Edina.

Every Edina street is unique and each Street Type plays an important role in its surrounding neighborhood and within the City's overall street network. Designs should balance the accommodation of motor vehicles with the Living Streets vision of promoting safety and convenience, enhancing community identity, creating economic vitality, improving sustainability, and providing meaningful opportunities for active living and better health.

Current Functional Classification

The functional street classification system uses a hierarchy to group classes of streets based on the relative emphasis of motor vehicle mobility and capacity versus non-motorized transportation and property access. The City of Edina's Comprehensive Plan identifies the following street functional classification hierarchy:

- *Local Streets*: These roadways provide the most access and the least mobility within the overall system. They allow access to individual homes, shops and similar traffic destinations. While through traffic is discouraged on local streets, a new street type called the Local Connector is introduced below as part of the Living Streets Plan that may accommodate local through traffic.
- *Collector Streets:* The collector system provides connections between neighborhoods, from neighborhoods to minor business concentrations, and between major traffic generators. Mobility and land access are equally important, and direct access should predominantly be to developed concentrations. Collector streets carry traffic between the arterial system and the local streets. Examples include West 70th Street and Wooddale Avenue.
- *Minor Arterials:* The emphasis on these roadways is on mobility as opposed to access; only concentrations of commercial or industrial land uses should have direct access to them (exceptions to this include minor arterials such as France Avenue, which includes sections with residential access). Minor arterials should connect to principal arterials, or other minor arterials, and collector streets. Examples include France Avenue and West 50th Street.
- *Principal Arterials:* These types of roadways carry the highest volumes of traffic and include all Interstate freeways. The emphasis is on mobility as opposed to land access. Principal arterials connect only with other Interstate freeways, other principal arterials, and select minor arterials and collectors. Examples include Trunk Highways 100, 169 and 62, and Interstate Highway 494. Principal arterials are not within the maintenance jurisdiction of the City, and as such will not be included in this Living Streets Plan.

This traditional functional classification system by itself, however, is not sufficient when designing an Edina Living Street. Street design should also take into consideration neighborhood context and the

diverse uses and users of Edina's streets. The Street Types contained in this Plan were developed to provide a range of options to help make informed decisions regarding street design.

In terms of functional classification, this Living Streets Plan would apply to the Local Streets, Collectors, and Minor Arterials as defined in the Comprehensive Plan. See Living Streets Classification Map (Figure 3.1) for locations of street types, and refer to Table 3.1 for a summary of each street type and their major design elements.

City of Edina
Classification of Living Streets

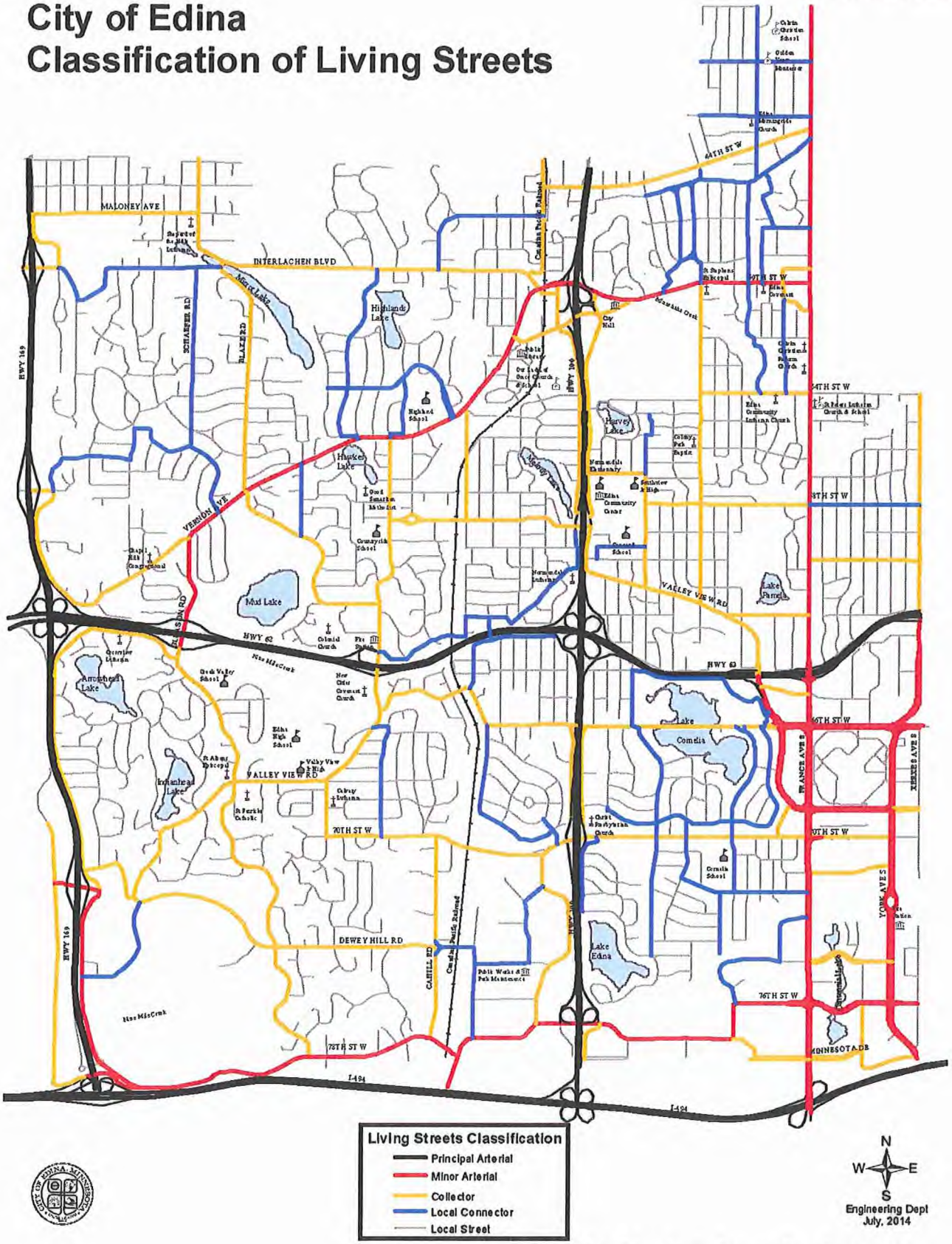


Figure 3.1. Edina Living Streets Classification Map

CLASSIFICATION AND ROLES OF LIVING STREETS

The matrix below (Table 3.1) was prepared to summarize the options for each element that are available on each of the four types of Living Street. The following is a brief discussion of each type of Living Street, including example design templates (cross sections). For all four street types, there are options for design elements such as the number of driving lanes, whether or not there are parking and/or bike facilities, whether or not sidewalks are to be provided, etc. The design templates represent the minimum and maximum roadway widths and number of design elements for each roadway type; the templates are not meant to represent all options and combinations of design elements.

Table 3.1. Edina Living Streets: Street Types

Edina Living Streets: Street Types										
Street Type	Driving Lanes			Parking Lanes [1]			Bike Facilities [2]	Sidewalk(s) [3, 8]		
	2	3	4	0	1	2		0	1	2
Local Street	● [5]				○	○	○ [4]	○ [6]	○ [7]	○
Local Connector	● [5]				○	○	○ [4]		●	○
Collector Street	○	○		○	○	○	●		●	○
Minor Arterial	○	○	○	○	○	○	●			●

○ = Optional feature

● = Required feature

Notes:
1. Parking shall fit context, and be limited where unnecessary or to improve safety.
2. Refer to the Bicycle Transportation Plan for location of approved bicycle routes.
3. Multi-use paved path may be used where appropriate.
4. If included, shared bicycle facilities are recommended on local and local connector streets.
5. Travel and parking lanes typically not striped.
6. Requires wider street width to accommodate pedestrians in roadway.
7. Required where street abuts or is in the vicinity of a public school, park or public building.
8. Refer to Context Criteria when considering an optional sidewalk.

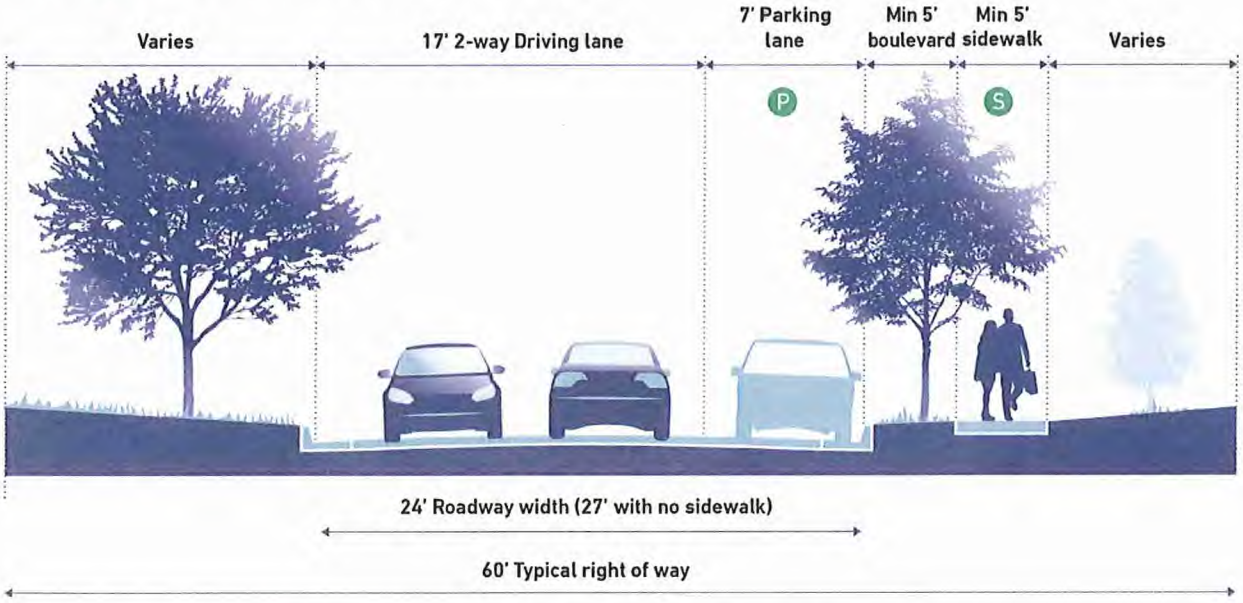
Local Street

For the purposes of the Living Streets Plan, Local Streets are those with a Local Street functional classification as defined in the Comprehensive Plan. These streets provide immediate access to residences and are used primarily for local trips and are characterized by lower vehicle and pedestrian volumes. The primary role of Local Streets is to contribute to a high quality of life for residents of Edina.

The following Living Streets standards and typical street cross-sections apply to Local Streets (the typical section below is a representative example of this street type and is not meant to represent all possible configurations):

- *Street Width*: 24 feet to 27 feet, depending on context and facilities included (see below).
- *Travel Lanes*: Two, typically without pavement markings
- *Parking*: Provided along one side of the street, or along both sides if deemed necessary
- *Bicycle Facilities*: Required if on an approved primary bike route, recommended if on an approved secondary bike route
- *Sidewalks*: Required where the street is near a public school, public building, community playing field or neighborhood park. Recommended on one or both sides of the street where determined by context. See Pedestrian Facilities chapter for more information.

Living Streets: Local Street Type



P Parking: None, one or both sides of the street, depending on context

S Sidewalk required on local streets when certain criteria are met. See Pedestrian Facilities in Chapter 4

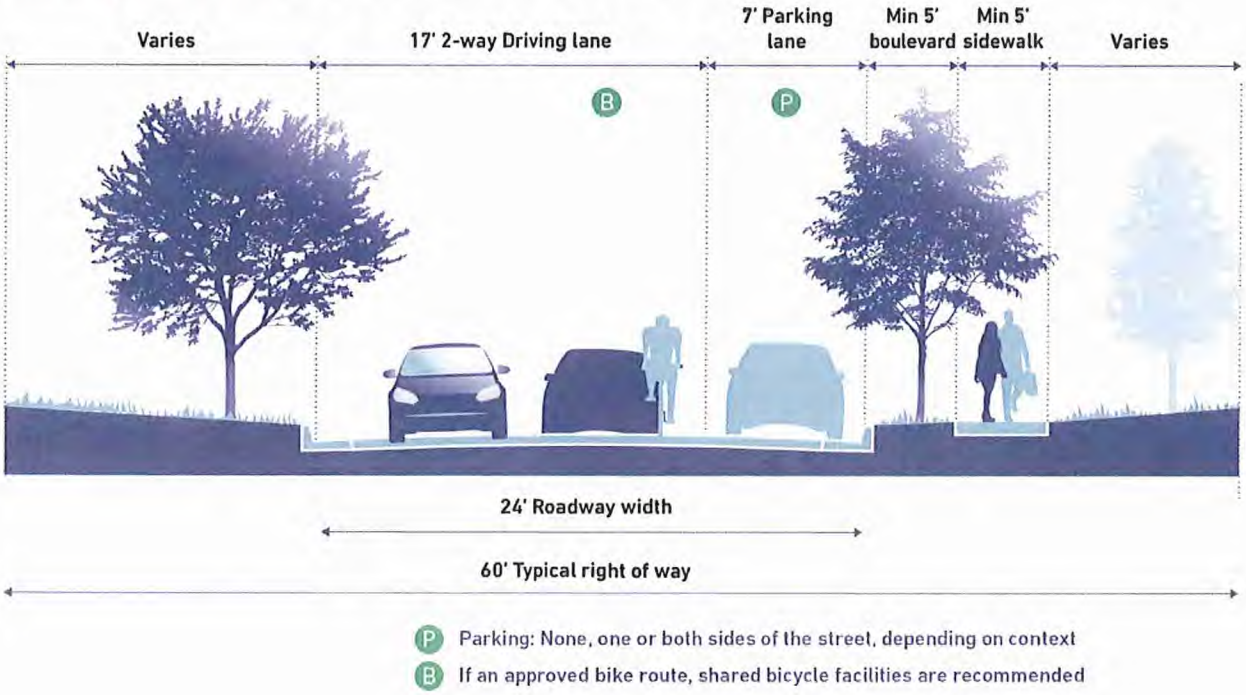
Local Connector

For the purposes of the Living Streets Plan, Local Connectors are those with a Local Street functional classification as defined in the Comprehensive Plan but providing higher traveled connections between neighborhoods, destinations and higher-level roadways. Local Connectors provide continuous walking and bicycling routes, and some may accommodate transit routes as well. While they are essential to the flow of people between neighborhoods and destinations, the needs of people passing through must be balanced with the needs of those who live and work along Local Connectors.

The following Living Streets standards and typical street cross-sections apply to Local Connectors (the typical section below is a representative example of this street type and is not meant to represent all possible configurations):

- *Street Width*: 24 feet to 30 feet, depending on context and facilities included (see below).
- *Travel Lanes*: Two, typically without pavement markings
- *Parking*: Provided along one side of the street, or along both sides if deemed necessary
- *Bicycle Facilities*: Required if on an approved primary bike route, recommended if on an approved secondary bike route
- *Sidewalks*: Required on one side of the street at minimum, on both sides as determined by context. See Pedestrian Facilities chapter for more information.

Living Streets: Local Connector-Street Type



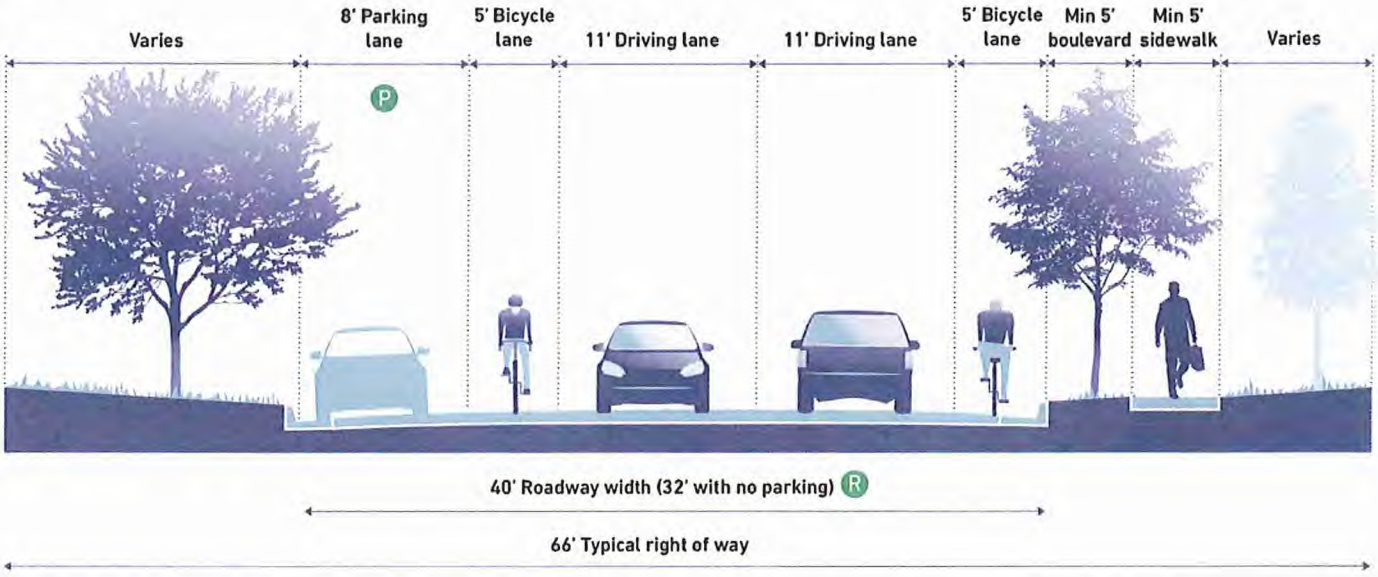
Collector Street

For the purposes of the Living Streets Plan, Collector Streets are any streets having a collector street functional classification as defined in the Comprehensive Plan. Collector Streets provide connections between neighborhoods, from neighborhoods to minor business concentrations, and between major traffic generators. Mobility and land access are equally important, and direct access should predominantly be to developed concentrations. Like for Minor Arterials (see below), safe and accessible pedestrian and bicycle accommodations should be provided at intersections along Collector Streets.

The following Living Streets standards and typical street cross-sections apply to Collector Streets (the typical section below is a representative example of this street type and is not meant to represent all possible configurations):

- *Street Width*: 32 feet to 52 feet, depending on context and facilities included (see below).
- *Travel Lanes*: Two or three
- *Parking*: None, one or both sides if the street, depending on context
- *Bicycle Facilities*: Required if on an approved primary or secondary bike route
- *Sidewalks*: Required on one side of the street at minimum, on both sides as determined by context. See Pedestrian Facilities chapter for more information.

Living Streets: Collector-Street Type



P Parking: None, one or both sides of the street, depending on context
R Roadway width may increase due to additional turn lane

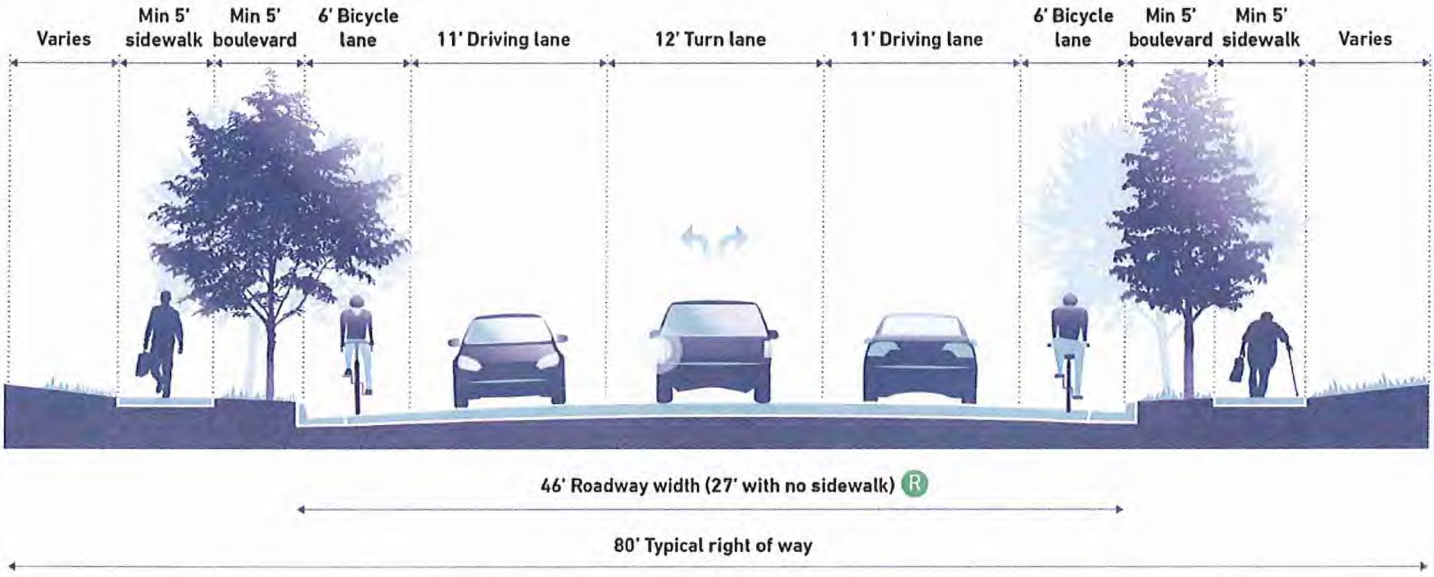
Minor Arterial

For the purposes of the Living Streets Plan, Minor Arterials are any streets having a minor arterial functional classification as defined in the Comprehensive Plan. As Minor Arterials have fewer intersections, which is convenient for motor vehicles, the combination of higher speeds and longer distances between signalized crossings can make these street types difficult for pedestrians and bicyclists to cross. Thus, it is important to provide safe and accessible pedestrian and bicycle accommodations at intersections along Minor Arterials.

The following Living Streets standards apply to Minor Arterials, with the exception of minor arterials under Hennepin County jurisdiction (the typical section below is a representative example of this street type and is not meant to represent all possible configurations):

- *Street Width*: Varies, depending on context and facilities included
- *Travel Lanes*: Two, three or four
- *Parking*: None, one or both sides if the street, depending on context
- *Bicycle Facilities*: Required
- *Sidewalks*: Required on both sides of the street. See Pedestrian Facilities chapter for more information.

Living Streets: Minor Arterial Type



P Parking: None, one or both sides of the street, depending on context
R Roadway width may increase due to additional parking, driving and/or turn lanes

4. DESIGN GUIDELINES

INTRODUCTION

TBD

Refer to Table 3.1 for a summary of how each element below is applied to each Living Street type.

Figure 4.1 below indicates minimum widths for pedestrian facilities and roadway lanes.

Street Type	Sidewalk	Boulevard	Turn Lane	Travel Lane	Bike Lane	Parking Lane
Local Street	5'	5'	Local streets are one to two travel lanes, with parking on one or both sides, and do not have pavement markings.			
Local Connector	5'	5'	Local connectors are one to two travel lanes, with parking on one or both sides, and do not have pavement markings.			
Collector Street	5'	5'	12'	11'	5'	8'
Minor Arterial	5'	5'	12'	11'	6'	8'

Notes

Travel Lanes	• On local and connector streets with parking on one side of the street and without shared-lane bicycle pavement markings, the overall minimum pavement width shall be 24 feet. • On streets without sidewalks, total pavement width shall be 27 feet to accommodate pedestrians walking on the street.
Bicycle Lanes	• The preferred width for bicycle lanes is 6 feet in areas with high volumes of bicyclists and in areas of high parking turnover. • Bicycle lanes 4 feet in width may be considreed on local or connector streets when not adjacent to on-street parking or at constrained intersections.
Parking Lanes	• Decisions regarding parking lane width when adjacent to bicycle lanes should consider parking turnover rates and volumes of heavy vehicles.
Sidewalk	• On collector and minor arterial Street Types, or where pedestrians are likely to travel in groups, wider sidewalks (8 to 12 feet) may be recommended.
Boulevard	• Boulevard width may vary depending on right-of-way or topographical constraints. • In shopping districts characterized by zero-lot lines, street furniture and/or on-street parking, the boulevard may be narrowed or eliminated to accommodate a wider sidewalk. • Stormwater best management practices (e.g. rain gardens, street trees) will be located in the boulevard where deemed appropriate.

Figure 4.1. Minimum widths for pedestrian facilities and roadway lanes

VEHICULAR FACILITIES

Driving Lanes

Driving lanes provide travel space for all motorized and non-motorized vehicles. It is recommended that lane widths be minimized to reduce impervious surface and construction and maintenance costs. Reduced lane widths encourage slower motor vehicle speeds, thereby calming traffic, and also free up space that can then be devoted to dedicated bike lanes or other purposes. Where curb and gutter exist, lane widths are measured to the curb face instead of the edge of the gutter pan or pavement.

Width

Lane width is determined by context; however, unnecessarily wide lanes should be avoided unless County or State regulations dictate otherwise (e.g. 11' travel lane widths are recommended for Collector Streets). Where dedicated pedestrian and/or pedestrian facilities are not provided, the outside travel lane may be widened to accommodate non-motorized roadway users.

Parking Lanes

On-street parking can be important in the built environment to provide parking for residents and their guests, as a buffer for pedestrians using a sidewalk when no boulevard exists, to help calm traffic speeds, and for the success of adjacent retail businesses. The need for on-street parking shall be evaluated with each project. The evaluation shall consider:

- Living Street and functional classification
- Adjacent land uses
- Parking demand (on-street parking that is not used results in unnecessarily wide streets, potentially increasing motor vehicle speeds)
- Competing uses for road or right-of-way space
- Construction and maintenance costs

Figure 4.2. Wooddale Avenue parking lane

The construction of unnecessary parking should be avoided, with parking prioritized below all travel modes when designing a street. Where possible, on-street parking should be inset and coordinated with the use of curb extensions.

Placement

Parking is permitted on one or both sides of local and local connector streets. When a street is reconstructed, parking should be limited to one side of the street and pavement width reduced accordingly (or converted for non-motorized vehicle use). Parking should be provided along one side of collector and minor arterial streets unless prohibited. On-street parking may be considered along both sides of these streets, depending upon context.

Width

On-street parking lanes shall be no less than 7 feet wide; unnecessarily wide parking lanes (i.e. greater than 8 feet) should be avoided. On streets where traffic levels or speed limits are higher than 30 mph (e.g. on some collectors and minor arterials), parking lane width may be increased to eight feet.

PEDESTRIAN FACILITIES

Refer to the Sidewealk Facilities Quadrant Maps (Figure 4.9 - Figure 4.12) for locations of sidewalks and park pathways.

Sidewalks

Sidewalks should provide a comfortable space for pedestrians between the roadway and adjacent land uses. Sidewalks are the most important component of pedestrian mobility. They provide opportunities for active living and access to destinations and critical connections between multiple modes of travel, as users of motor vehicles, transit and bicycles all must walk at some time during their trip.

Figure 4.3. Sidewalk in the Country Club neighborhood

Sidewalks are required where (see Table 3.1 for further information):

- A street abuts or is in the vicinity of a public school, public building, community playfield, or neighborhood park. Termini to be determined by context.
- On both sides of minor arterial streets.
- On one or both sides of collector streets.
- On one side of local connectors, or both sides as determined by context (see below).
- As required by zoning code or condition of plan approval.

Context Criteria

The following context criteria may be used when determining whether an optional sidewalk should be required. The criteria may be applied in any combination, using engineering judgment. An optional sidewalk may be required when:

- Average daily traffic is greater than 500 vehicles.
- 85th percentile speed is greater than 30 mph.

- There is a history of crashes involving pedestrians walking along the roadway.
- Transit stop(s) are present.
- The street is identified as an active (safe) route to school, park, or commercial destination.
- A sidewalk would create a logical connection between destinations.
- Site lines, roadway geometry, or insufficient lighting makes it difficult for motorists to see pedestrians walking along the roadway.
- The street width is less than 27 feet.

Width

Sidewalks shall be a minimum of 5 feet wide to provide adequate space for two pedestrians to comfortably pass side-by-side. Wider sidewalks (8 to 12 feet) are recommended where pedestrians are likely to travel in groups, such as near schools and in shopping districts, or where adjacent to transit stops.

Figure 4.4. 5-foot sidewalk with planted boulevard

Boulevard

A standard minimum 5-foot boulevard (the space between the sidewalk and the curb or edge of pavement) shall be provided whenever possible to increase pedestrian safety and comfort, as well as providing space for snow storage (Figure 4.4). Minimum planted boulevard widths may be two feet (see following paragraph).

In shopping districts characterized by zero-lot lines, street furniture and/or on-street parking, sidewalks may be wider with no boulevard. Additionally, a shallower boulevard or curbside sidewalk may be constructed when the cost of constructing a five-foot boulevard would be excessively disproportionate due to existing right-of-way or topographical constraints. Curbside sidewalks shall have a minimum width of 6 feet unobstructed for travel (5 feet clear of sign posts, traffic signals, utility poles, etc., plus one foot for snow storage/clearing operations).

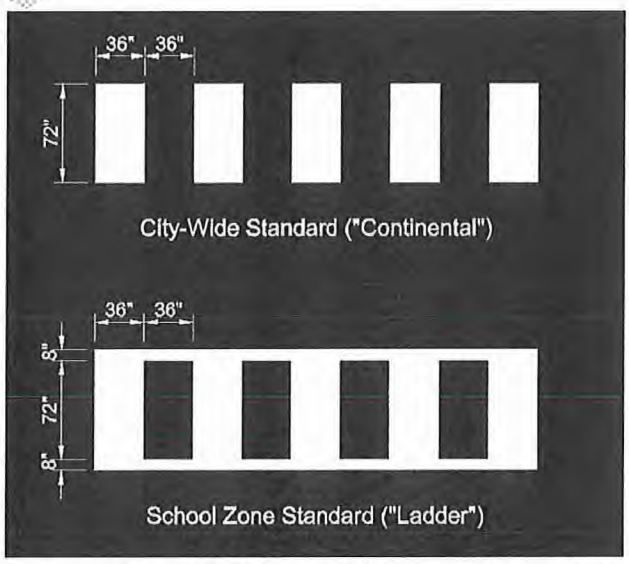


Figure 4.5. Edina marked crosswalks standards

Pedestrian Crossings

The safety of all street users, particularly more vulnerable groups such as children, the elderly and those with disabilities must be considered

when designing a street. This is particularly pronounced at potential conflict points where pedestrians must cross streets.

Both real and perceived safety must be considered when designing crosswalks – pedestrian crossings must be comfortable. A safe crossing that no one uses serves no purpose.

Refer to Edina's Traffic Safety Committee and the Minnesota Manual on Uniform Traffic Control Devices (MNMUTCD) for local traffic control policies regarding marked pedestrian crosswalks.

Marked Crosswalks

Marked crosswalks are commonly used at intersections and sometimes at mid-block locations, and are often the first tool used to address pedestrian crossing safety issues. By state law every intersection has crosswalks, whether marked or unmarked, and motorists are required to yield to pedestrians in these crosswalks (unless pedestrian crossing is prohibited). Marked crosswalks alert drivers to expect crossing pedestrians and direct pedestrians to desired crossing locations; however, marking crosswalks at every intersection is not necessary or desirable.

Figure 4.6. Crossing island

The City of Edina has standards for types or styles of marked crosswalks (see Figure 4.5). The type of marked crosswalk shall be determined by context and the following general principles:

- City-wide standard (Continental) crosswalk: 36-inch wide x 72-inch long painted blocks, spaced at 36-inch intervals
- School zone standard (Ladder): Same as Continental (above), with 8-inch lateral painted lines
- Specialty crosswalks: May include brick inlay crosswalks (such as in the Countryside Neighborhood), colored concrete crosswalks (50th & France district) or existing patterned Duratherm crosswalks

Crossing Islands and Curb Extensions

Raised islands/medians and curb extensions are effective measures for improving street crossings. These tools reduce the distance and complexity of crossing wide streets with traffic coming from two opposing directions at once. They can also slow vehicle traffic (see Traffic Calming, XXX). With the use of crossing islands (sometimes referred to as a "median refuge") conflicts occur in only one direction at a time (Figure 4.6). Curb extensions (Figure 4.7) shorten crossing distance, reduce time it takes for a pedestrian to cross a

Figure 4.7. Curb extension with crosswalk

street and their exposure to moving vehicles, and can increase pedestrian visibility. See Table 4.2 for recommended applications of crossing islands/median and curb extensions at pedestrian crossings.

Activated Mounted Flashers

In addition to crossing islands and curb extensions, there are other measures to enhance and improve marked crosswalks. Enhanced crossing measures that may be applied in Edina include pedestrian-activated pedestal and overhead mounted flashers (Figure 4.8). While these techniques are typically applied at mid-block crossings to warn drivers that pedestrians may be present, they can also be used at crosswalks at uncontrolled intersections.

Figure 4.8. Crossing with activated mounted flashers (Rectangular Rapid Flashing Beacons)

If activated mounted flashers are used, they should be placed in conjunction with signs and crosswalks. An engineering study may be conducted to determine if a crossing may benefit from pedestrian-activated mounted flashers. Refer to the City's local traffic control policies for further information.

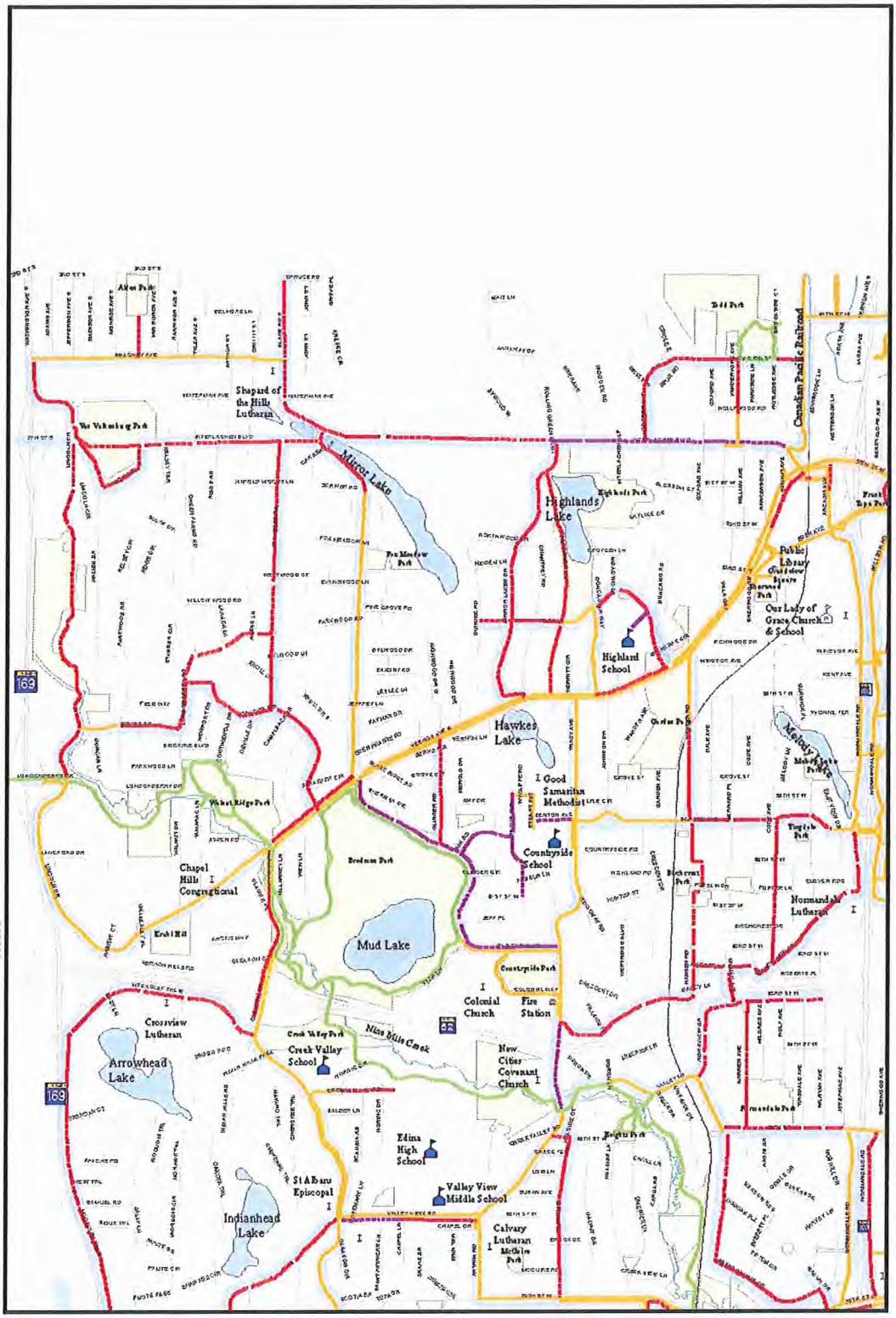
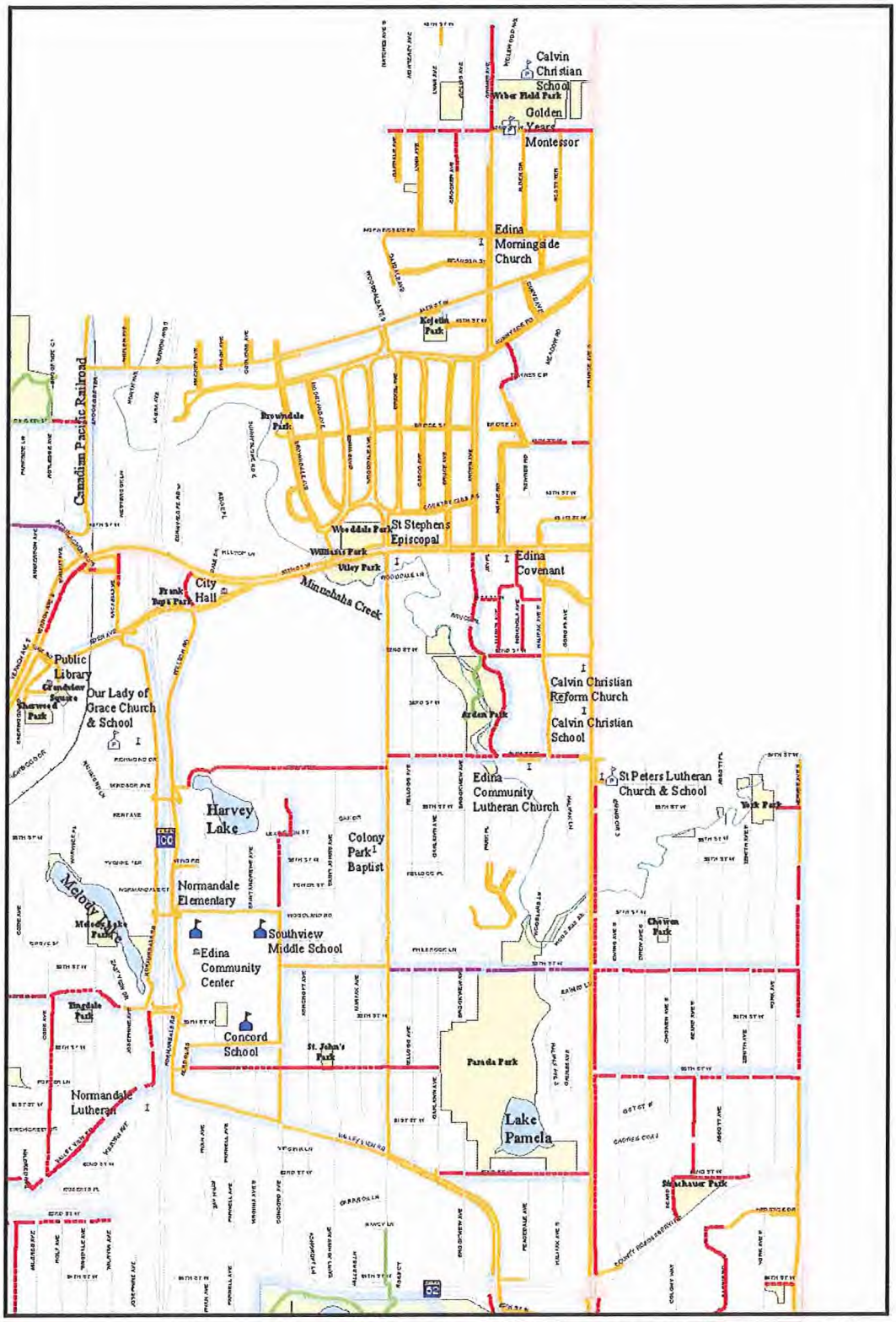


Figure 4.9. Pedestrian Facilities Map: Northwest Quadrant



edina living streets
our streets connect us all

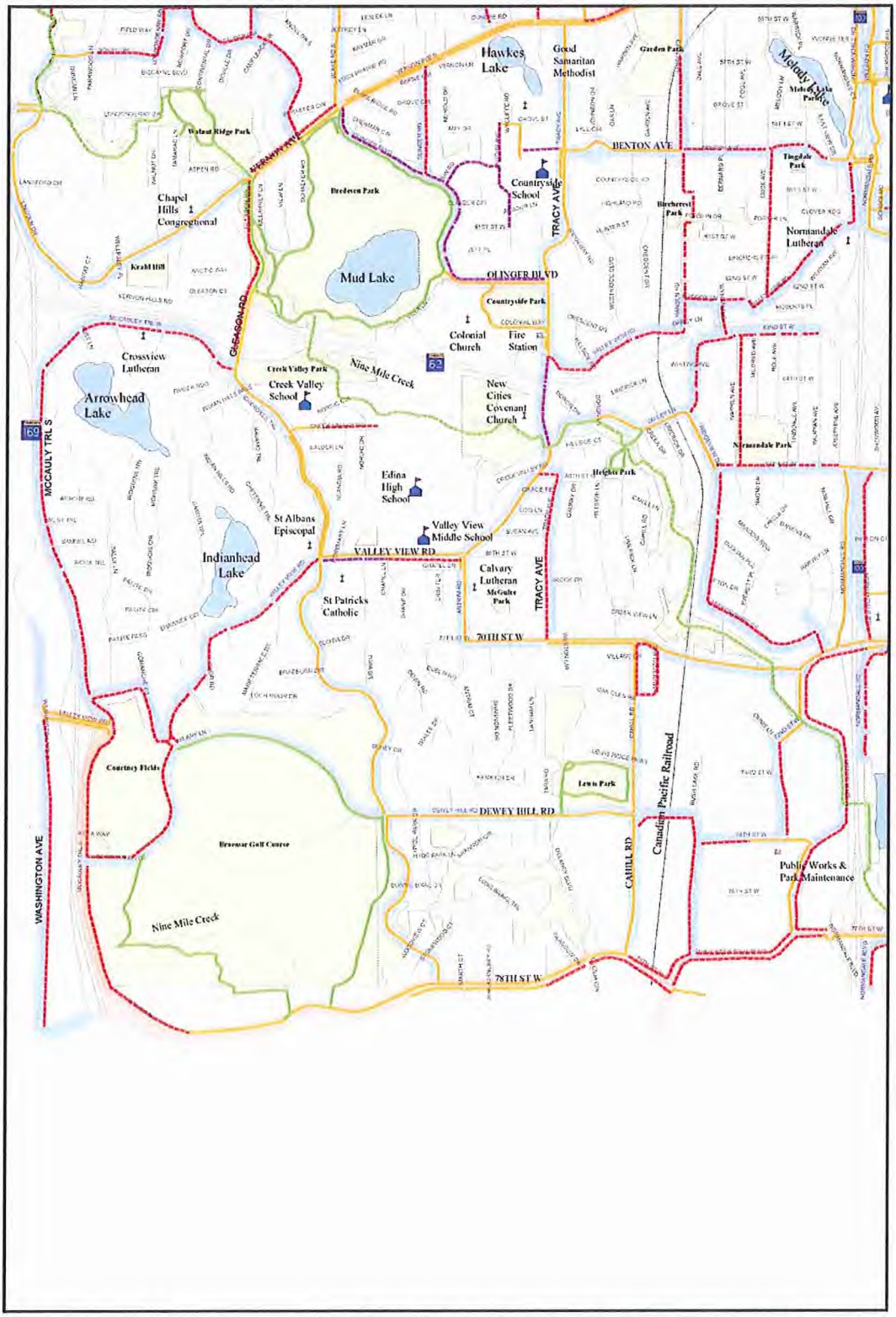
Draft Sidewalk Facilities: Northeast Quadrant

Living Streets Classification
- Collector & Local Connector
- Minor Arterial

- Existing Sidewalk
- Existing Park Pathway
- Proposed Sidewalk
- Proposed Regional Trail
- Recommended Active Routes To School Sidewalk

Engineering Dept
July, 2014

Figure 4.10. Pedestrian Facilities Map: Northeast Quadrant



edina living streets
our streets connect us all

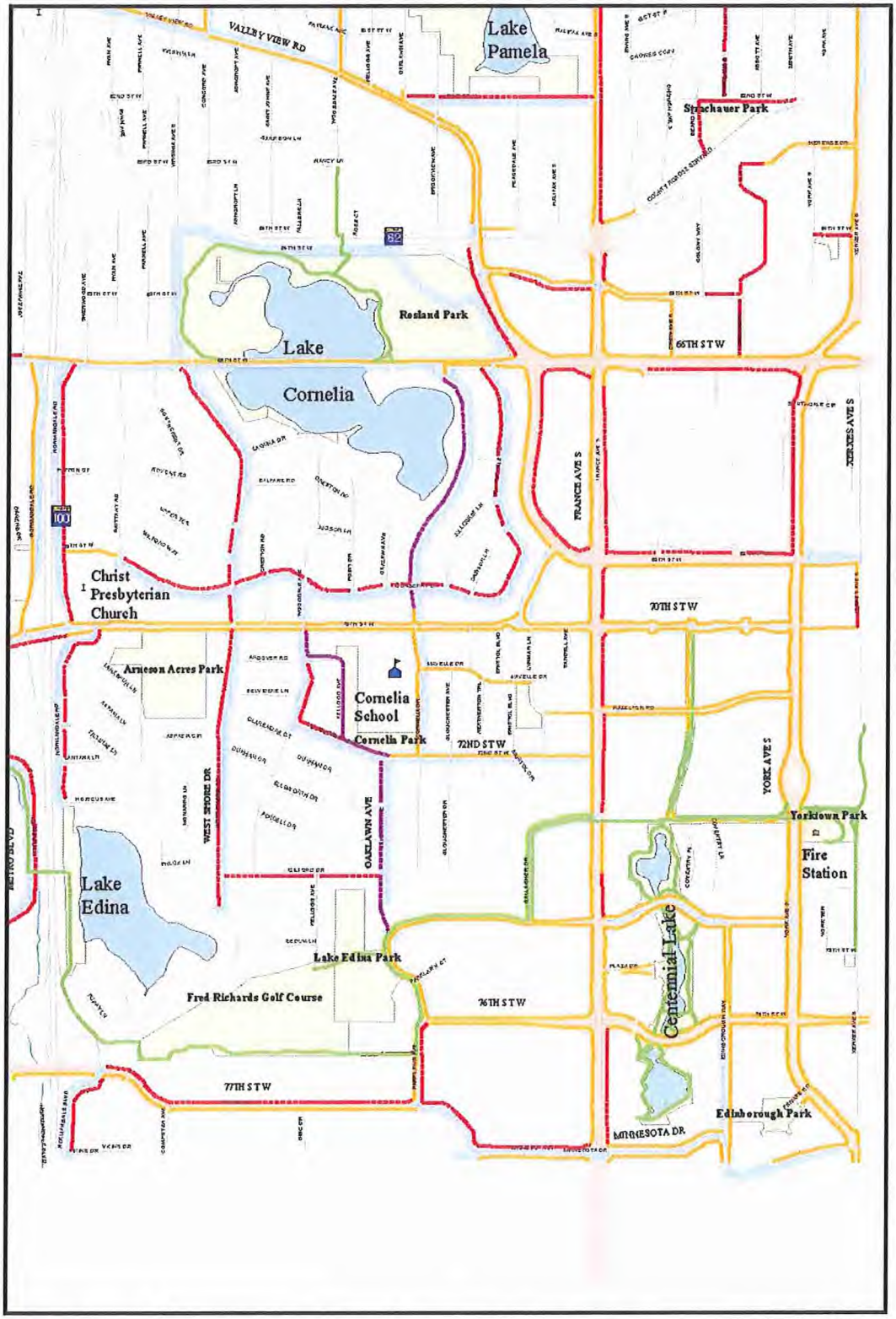
Sidewalk Facilities: Southwest Quadrant

Living Streets Classification
- Collector & Local Connector
- Minor Arterial

- Existing Sidewalk
- Existing Park Pathway
- Proposed Sidewalk
- Proposed Regional Trail
- Recommended Active Routes To School Sidewalk

Engineering Dept
May, 2014

Figure 4.11. Pedestrian Facilities Map: Southwest Quadrant



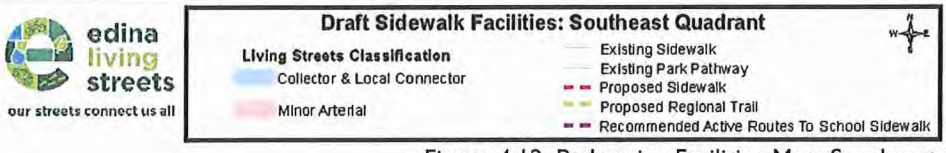


Figure 4.12. Pedestrian Facilities Map: Southeast Quadrant

BICYCLE FACILITIES

The Living Streets Policy and Plan indicates that bicyclists – just like motorists and pedestrians – should have safe, convenient, and comfortable access to all destinations in the City. Indeed, every street (excepting principal arterials) is a bicycle street, regardless of bikeway designation. Edina's network of Living Streets shall accommodate all types, levels, and ages of bicyclists. Bicycle facilities should take into account vehicle speeds and volumes, with shared use on low volume, low-speed road and separation on higher volume, higher-speed roads.

Figure 4.13. Bike lane on Tracy Avenue

Types and Placement

Table 3.1 indicates on which street types bicycle facilities (shared or separated) shall be located/considered. The City of Edina Comprehensive Bicycle Transportation Plan shall be consulted to determine where approved bike routes are located. Refer to Table 4.1 for guidance on the application of each type of bicycle facility.

Figure 4.14. Advisory bike lane

Bike Lanes

Bike lanes provide dedicated space on the roadway for bicycle use. Bike lanes are separated from the lane used by motor vehicles by a solid white line. Bike lanes are also marked with a white bicycle symbol and arrow on the pavement and signed at regular intervals (Figure 4.13). "Buffered" bike lanes are similar to regular bike lanes, but also include a marked buffer between the bike lane and the adjacent driving lane. This buffer area is marked with white diagonals or chevrons to indicate that no vehicles are allowed to travel in the buffered area.

As a bike lane approaches an intersection or bus stop, a dashed line may be used instead of a solid white line to indicate the space is shared by motorists and bicyclists. A dashed line may also

Figure 4.15. Shared lane markings or "sharrows"

be used to stripe the bike lane through intersections.

Advisory Bike Lanes

Advisory bike lanes are used on streets that are too narrow for dedicated bike lanes. Advisory bike lanes look like dedicated bike lanes, except a dashed line is used in place of a solid bike lane stripe (Figure 4.14). A dashed line signals to drivers that they may drive in the advisory bike lane.

Advisory bike lanes do not narrow the travel lanes or reduce the amount of roadway space that can be used by motor vehicles. Additionally, they bring greater awareness to the roadway as shared space and can help to reduce vehicle speeds and improve roadway safety. At present, advisory bike lanes are considered experimental by the Federal Highway Administration (FHWA).

Shared Lane Markings

Shared lane markings or "sharrows" (derived from "shared" and "arrows") are pavement markings used to mark a designated bike route. Placed in the travel lane, they encourage bicyclists to ride in a safe position outside of the door zone (where driver's side doors of parked cars open).

Shared lane markings include a bicycle symbol and a double chevron indicating the direction of travel (Figure 4.15). They do not designate any part of the roadway as exclusive to either motorists or bicyclists. Rather, shared lane markings emphasize that the travel lane is shared.

Figure 4.16. Bike Boulevard on Cornelia Drive

Bike Boulevard

A bike boulevard is a lower-volume street that has been improved for bike traffic, often serving as an alternative bicycle route to a street with higher traffic volumes. Bike boulevards may include traffic-calming measures such as traffic circles, and can be optimized for use by cyclists (e.g. removing stop signs in through direction). Bike boulevards are designated with pavement markings that include a large bicycle symbol with the text "BLVD" (Figure 4.16). The markings are not intended to guide the bicyclists.

Share The Road

"Share The Road" reminds motorists, bicyclists and pedestrians that all modes of transportation may use the roadway. "Share The Road" may be posted in conjunction with shared lane markings, on a bike boulevard, or on a bike route without pavement markings (Figure 4.17). Where a bike lane ends, but the bike route continues, "Share The Road" may also be posted. Signage that

Figure 4.17. "Share the Road" signage

indicates "Bikes May Use Full Lane" may also be considered where appropriate.

Although all roads in Edina are shared, these signs communicate to motorists and cyclists that the road has been identified to encourage use by cyclists, but lacks separate bicycle facilities.

Bicycle or Shared Use Path

A bicycle or shared use path is a facility that has been designed for bicycle use and constructed separately from the roadway or shoulder. A bicycle path may be for exclusive use by bicyclists (bike path), or it may be shared with pedestrians (shared use). A bicycle path that is adjacent to a roadway is a side path (Figure 4.18).

Figure 4.18. Shared use path along Gallagher Drive

Paved Shoulders

The shoulder is the part of the street that is contiguous to and on the same level as the part of the street that is regularly used for vehicle travel, and may be paved, gravel or dirt (Figure 4.19). The shoulder is typically separated from the traveled part of the street by a solid white line, called an "edge line" or "fog line."

Paved shoulders can look a lot like bike lanes, but differ from bike lanes in some important ways:

- Bike lanes have bicycle pavement markings and Bike Lane signs; paved shoulders do not.
- Bike lanes have been designed for cycling; paved shoulders have not.
- Parking is not permitted on bike lanes unless posted otherwise; parking is permitted on paved shoulders unless posted otherwise.

Figure 4.19. Example of a paved shoulder

- Cyclists may use the shoulder, but are not required to.

Table 4.1. Appropriateness of bicycle facilities

BICYCLE FACILITIES	Living Streets Classification			
	Local Street	Local Connector	Collector Street	Minor Arterial
Bike Lanes		●	●	●
Advisory Bike Lanes		●	●	
Shared Lane Markings/Sharrows	●	●	●	●
Bike Boulevard	●	●		
"Share the Road"	●	●	●	●
Shared Use Path	●	●	●	●
Paved Shoulders	●	●	●	●

Legend:	
●	Appropriate
●	Appropriate in specific circumstances
	Not Appropriate

Intersections

Given that intersections are junctions where different modes of transportation meet, a well-designed intersection should facilitate the interaction between bicyclists, pedestrians, motorists and transit. This should be done in a safe and efficient manner that reduces conflicts between bicyclists and vehicles, including heightening the visibility, denoting a clear right-of-way, and ensuring all users are aware of each other.

Figure 4.20. Bike lane "pocket" on W. 70th Street

Bike Lane Markings

Pavement markings for bike lanes (see above) should extend up to the crosswalk (or stop bar if crosswalk is not marked) to ensure that separation, guidance on proper positioning, and awareness by motorists are maintained through these conflict areas. At right-turn lanes, a bike lane "pocket" (Figure

4.20) shall be placed between the right-turn lane and the rightmost through lane. If a full bike lane cannot be accommodated, a shared bicycle/right-turn lane can be installed that places a standard-width bike lane on the left side of the right-turn lane. A dashed stripe delineates the space for bicyclist and motorists within the shared lane. Sharrows are another option for marking a bike lane through an intersection where a bike lane pocket cannot be accommodated.

Figure 4.21. Green colored pavement highlighting a "conflict area" at W. 70th Street and Metro Boulevard

Green Bike Lanes at Conflict Points

Green colored pavements are used to highlight conflict areas between bicycles and motor vehicles at heavy turning and merging locations approaching and within intersections (Figure 4.21). Green colored pavement can be used in conjunction with sharrows and/or dashed white stripes to delineate the edge of the green colored pavement.

Bicycle Signal Detection

Bicycle detection is used at actuated traffic signals to alert the signal controller of bicycle crossing demand on a particular intersection approach. Bicycle detection can occur by automated means such as in-pavement detection loops (Figure 4.22). Such loops have increased sensitivity to detect bicycles. Signage and pavement markings should be used to provide clear guidance to bicyclists on how to actuate detection.

Figure 4.22. In-pavement bicycle detector loop on 54th Street at France Avenue

TRAFFIC CALMING

The primary goal of traffic calming is to slow motorists to a desired speed by using design in a context-sensitive manner while working with stakeholders. Traffic calming is acceptable and encouraged on all street types, and when utilized effectively can physically encourage motorists to drive at the desired speed.

Traffic calming uses a combination of physical measures that alter driver behavior and improve conditions for non-motorized street users while accommodating the needs of motorists. While speed reduction of motor vehicles and increased motorist awareness of non-motorized road users are the primary goals of traffic calming, these measures can also be designed to treat and manage stormwater and improve the aesthetics of the street.

Please refer to Table 4.2 for guidance regarding the applicability of the traffic calming techniques described below. It should be noted that often a combination of techniques is needed to calm traffic

effectively, and their application should take into account overall traffic flow and emergency vehicle access throughout the corridor.

Road Diet

A road diet entails the narrowing and/or removal of driving lanes from the street cross-section (both of which are traffic calming measures). The reclaimed roadway space can be used for bicycle lanes, sidewalks, landscaped boulevards or medians, and/or on-street parking.

For streets to be considered for this measure

Picture (see caption)

Figure 4.23. Roadway before road diet

Raised Medians

Often used as components of a road diet, raised, planted medians can calm traffic in multiple ways. Medians can help define the travel lane, while the vertical curb and median plantings provide visual cues to motorists to slow speeds. Medians that extend through intersections can also provide volume control by blocking through movement at a cross street. Additionally, medians can provide a refuge (if designed appropriately) for pedestrians crossing a wide, multi-lane street (see "Crossing Island and Curb Extensions" above).

Picture (see caption)

Figure 4.24. Roadway after road diet

Roundabouts and Traffic Circles

Roundabouts and traffic circles require traffic to circulate counterclockwise around a center island. Traffic circles are raised islands placed in intersections, and are effective for calming traffic at these locations (Figure 4.25). This is especially true within neighborhoods, where large vehicle traffic is not a major concern but speeds, volumes and safety are problems. Traffic circles replace stop signs at intersections, which can improve safety at locations where stop sign compliance may be lower.

Figure 4.25. Traffic circle at W. 54th Street and Drew Avenue South

Roundabouts, unlike traffic circles, are used on higher volume streets to allocate to minimize conflicts between competing movements (Figure 4.26). Roundabout have been shown to be reduce the number and severity of crashes while at the same time more efficiently moving vehicles

through an intersection when compared to traditional signalized intersections. Roundabouts can moderate speeds on collector and arterial streets and are aesthetically pleasing if well-landscaped.

Figure 4.26. Roundabout at W. 70th Street and Valley View Road

Curb Extensions

In addition to shortening the crossing distance for pedestrians (see "Crossing Island and Curb Extensions" above), curb extensions (sometimes referred to as "bumpouts" or "neckdowns") can also help to reduce the speed of vehicles. This is accomplished by reducing the roadway width from curb to curb at planned locations, and by tightening the curb radii at intersection corners, reducing the speeds of turning vehicles. Curb extensions also protect on-street parking bays and provide opportunities for landscaping and rain gardens (see below).

On-Street Parking

On-street parking also functions as a traffic-calming device when vehicles are regularly parked in the parking lane. Vehicles parked in the street physically and visually narrow the roadway and can increase the level of activity on the street as people come and go from parked cars. This can cause motorists to be more alert and slow vehicle speeds. On-street parking (when striped and/or utilized) can also provide a buffer between moving vehicles and pedestrians who may be walking on an adjacent sidewalk.

Bike Lanes/Buffered Bike Lanes

Like on-street parking, marked on-street bike lanes provide a buffer between pedestrians on an adjacent sidewalk and motor vehicle traffic. Additionally, the lane markings indicate where motorists should be driving and effectively narrow the travel lane. The potential presence of cyclists can also alert motorists to slow down and be aware.

Street Trees

In addition to their environmental benefits (see section XX.X), trees, when located on both sides of the street (especially in boulevards and medians) create a sense of enclosure that discourages drivers from speeding. Street trees create vertical walls that frame streets and provide a defined edge. This helps motorists guide their movement and assess their speed, which can lead to overall speed reduction. Also, the presence of street trees creates a safer walking environment by providing distinct edges to sidewalks so that motorists can better distinguish between their environment and the one shared with people.

Raised Intersections/Crosswalks

A raised intersection is a flat raised area covering an entire intersection, with ramps on all approaches and often combined with textured materials (see below) on the flat section. Typically, they raise to just below the level of the sidewalk. Raised intersections are more readily perceived by motorists to be "pedestrian territory" and the change in grade slows vehicle speeds.

Similarly, raised crosswalks are often marked by different materials to provide pedestrians with a level street crossing and to make them more visible to approaching motorists. They can act as "speed tables" to slow vehicle speeds.

Textured and/or Colored Pavement

Textured and colored pavement includes the use of stamped pavement or alternate paving materials to create an uneven surface for vehicles to traverse. They may be used to emphasize either an entire intersection or a pedestrian crossing, and are sometimes used along entire street blocks. Locations where textured and/or colored pavement are often used include parking lanes, bike lanes, pedestrian crossings (Figure 4.27), and intersections.

Figure 4.27. Brick crosswalk in the Country Club neighborhood

Other tools that can be used to calm traffic include fixed and temporary dynamic speed signs and enforcement of traffic laws.

Table 4.2. Applicability of Traffic Calming Measures

Traffic Calming Measure	Living Streets Classification			
	Local Street	Local Connector	Collector Street	Minor Arterial
Reduction in number of lanes	●	○	○	○
Lane width reduction	○	○	○	○
Median refuge		●	○	○
Curb extention	○	○	○	○
On-street parking	○	○	○	●
Bike lanes/protected bike lanes		●	○	○
Street trees	○	○	○	○
Textured and/or colored paving materials	●	○	○	○
Roundabouts	●	○	○	○
Traffic Circles	○	○		
Raised intersections	○	○	●	
Raised crosswalks	○	○	●	
Speed tables	●	●		

Legend:

○	Appropriate
●	Appropriate in specific circumstances
	Not Appropriate

STORMWATER MANAGEMENT AND SUSTAINABLE INFRASTRUCTURE

Stormwater Management

The implementation of Living Streets practices has the potential to enhance two core stormwater utility functions, flood protection and clean water, by retaining water on the landscape and filtering runoff. Living streets stormwater practices are broadly named "Low Impact Development" (or LID) practices, and also referred to as "Green Infrastructure." These living streets practices have the potential to provide multiple benefits as well including a beautiful streetscape, flourishing trees,

Service Level Definition

The City of Edina stormwater utility provides two services to the public, flood protection and clean water. Stormwater management priorities are described in the City of Edina Comprehensive Water Resources Management Plan (December 2011). Performance measurements for flood protection include peak rate measure in cubic feet per second and runoff volume measured in acre-feet, and for clean water include removal of sediment measured in tons and phosphorus measured in pounds.

Service	Performance Measure	Service
Flood Protection	Peak rate control in cubic feet per second	cfs
Flood Protection	Flood volume control in acre feet volume	ac-ft
Clean Water	Phosphorus pollutant removal in pounds	lb-P
Clean Water	Gross and fine solids removal in tons	ton-sed

Stormwater Utility

To the extent that implementation of living streets concepts coincides with stormwater management goals, and overlaps with identified priorities watersheds, funding from the City of Edina stormwater utility is available for public improvement. Some LID techniques, and the specific location and efficiency of any technique will vary based on design, and location in the watershed. Engineering review and cost benefit comparison can often provide guidance to the most effective selection and placement of individual practices. The following table summarizes the living streets practices, and their overlap with stormwater services, and relative cost effectiveness.

Practice	Flood Protection	Clean Water	Cost Effectiveness
Impervious cover reduction	High	Medium	Savings
Soil / Turf / Trees	High	Medium	Low
Bio-retention / Rain	Medium	Medium	Medium

Gardens				
Pervious Pavements	Medium	Medium		High
Underground Sediment / Infiltration		Low	Medium	High
Swales, filters / other		Low	Medium	Medium
Natural area creation, protection, restoration		High	High	Savings
Regional ponds and wetlands		High	Medium	Low
Pollution prevention		Low	High	Low

Discuss capital cost efficiency, maintenance burden and lifecycle cost efficiency, efficiency and relation to size of BMP,

Sustainable Infrastructure

ENVISION, multiple benefits, community maintenance, public maintenance, Sustainable techniques

Streetscape and Toolbox

LID techniques

Living Streets Prioritization

See Figure 4.28.

Describe priority watersheds / Describe targeted treatments that match the need of each priority watershed/ describe areas of the city with existing treatment as non-priority and diminishing returns of layered BMPs

Prioritize flood protection in landlocked catchments, water quality in lakes catchments, both in creek catchments. Opportunistic treatment in already treated areas draining to wetland networks that provide treatment.

A subwatershed assessment study is a useful tool for scoping where and what types of stormwater treatments are best applied in an individual neighborhood.

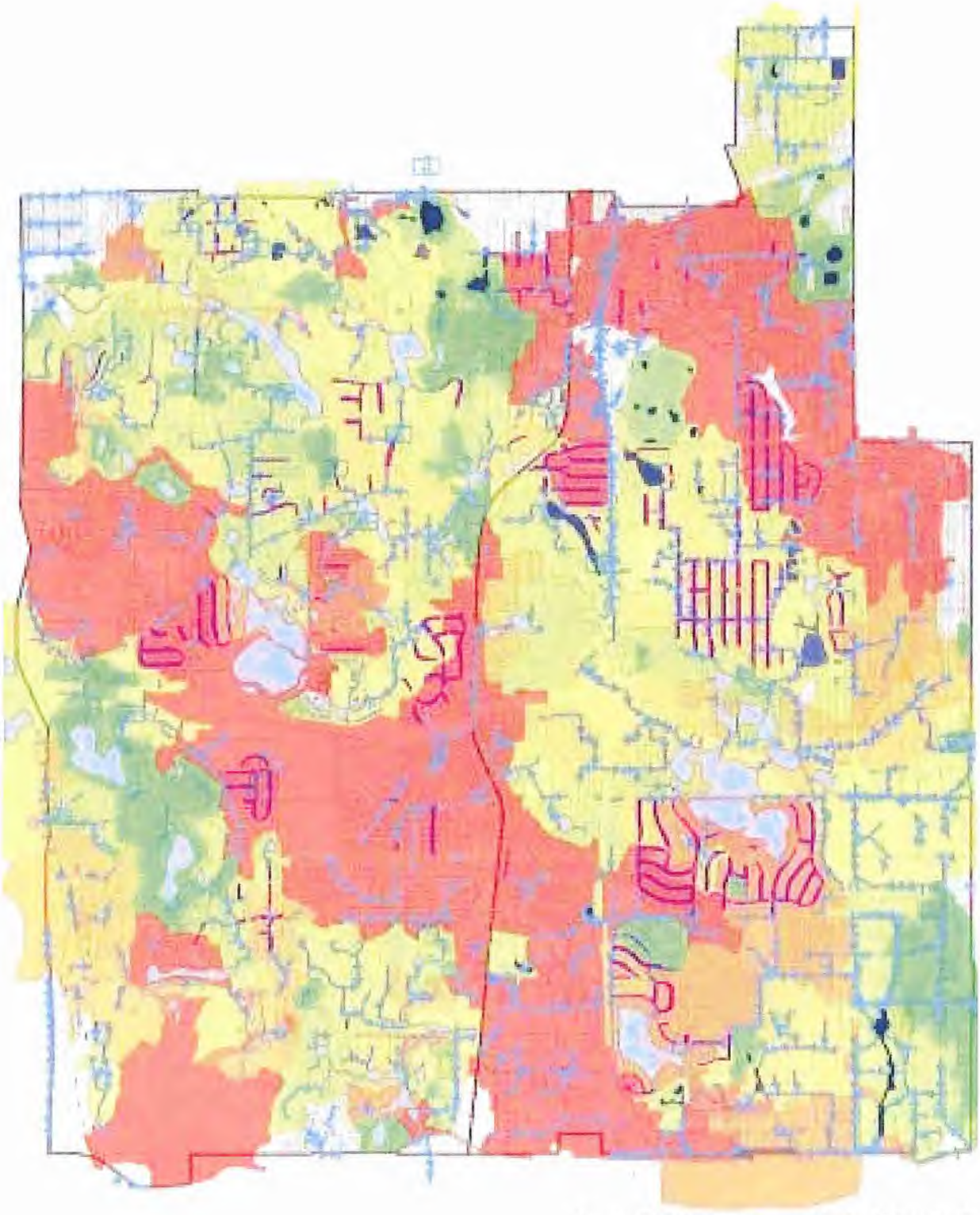


Figure 4.28. Living Streets Priority Watersheds

Example Project Schedule and Design Process

Describe schedule for scoping study and neighborhood engagement, Public meeting,

Sustainable Infrastructure

Purpose and ENVISION

Quality of Life

Description + transit, safety, overlap

Leadership

Description

Resource Allocation

Description + CH10 overlap

Natural World

Description + stormwater management policy overlap

Climate and Risk

Description + flood protection overlap

Streetscape / Toolbox

Description

Impervious cover reduction

Opportunity, Examples for each level of street, limitations, costs

Soil, turf and trees

Opportunity, Examples, limitations, costs

Bio-retention and rain gardens

Rain gardens collect, filter and infiltrate stormwater from roads, driveway, roofs and other hard surfaces. A rain garden uses water runoff as a resource to grow flowers and trees, and replenish local groundwater. Rain gardens are generally well landscaped with native plants and greenhouse cultivars and tend toward ornamental arrangements of flowers and grasses. Rain gardens are subset of bio-retention practice.

Bioretention

Examples, limitations, costs

Pervious pavements

Opportunity, Examples, limitations, costs

Underground sediment capture and underground infiltration

Opportunity, Examples, limitations, costs

Swales, sand filters and other controls

Opportunity, Examples, limitations, costs

Natural area creation, enhancement or conservation

Opportunity, Examples for each level of street, limitations, costs

Regional systems, ponds and wetlands

Opportunity, Examples, limitations, costs

Pollution prevention

Opportunity, Examples, limitations, costs (similar to sustainability analysis, SWPPP operations, WHPP)